



Here's a straight-line turntable that won't play your records lying down. It's the LT 5V from Mitsubishi, and it must stand vertically during operation. A pressure pad on the spindle holds records in place, while arm and stylus track in a straight line along a recessed worm gear.

PM photo: Steve Fay

TURNTABLES THAT PLAY IT STRAIGHT

These straight-line turntables move the needle across your records in the same manner the record grooves were originally cut on the masters. This accuracy results in high playback quality.

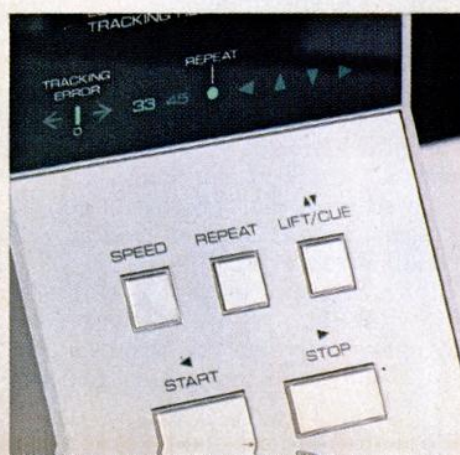
by Fred Petras

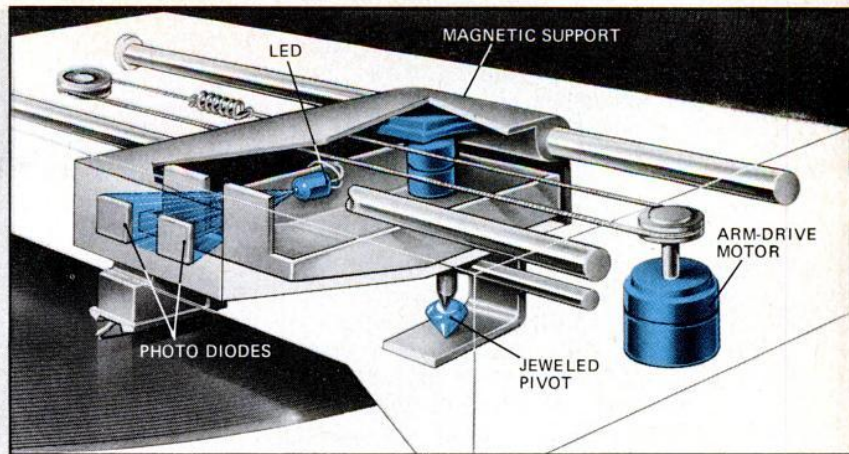
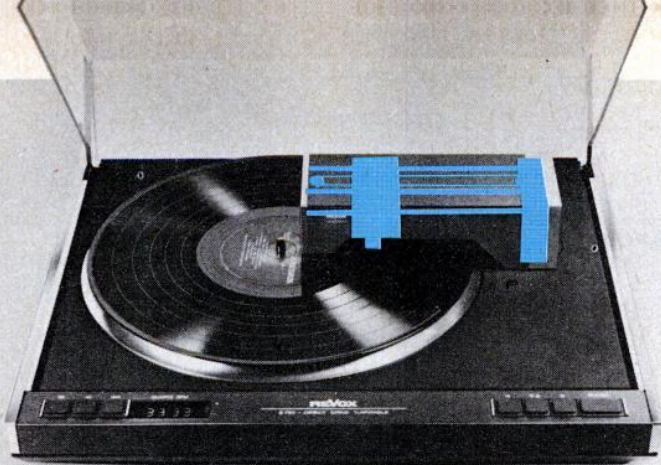
Shortly after celebrating the phonograph's 100th anniversary, the audio industry is rediscovering Thomas Edison's approach to the phonographic art. Edison believed that the radial-drive, straight-line, tangential tracking method was the best way to move a pickup and its

Easy-on-the-fingers controls set functions of the LT 5V, including lifting tone arm.

"needle" to extract all the nuances of sound in the record groove. After all, that's the method used to engrave the sound in the record groove in the first place.

The audio industry is taking a new look at Edison's tangential tracking method—relative to today's state-of-the-art records that impose stiff demands on the equipment meant to play them.





Revox Model B795 sells for \$599. Stylus is carried not by a tone arm, but by a "trolley" arrangement. The system, called Linatrack, is one of the most novel. It's explained at right.

Revox's Linatrack system moves the stylus across the record much as an industrial crane moves along its tracks. Photodiodes watch upcoming grooves and keep stylus angle properly adjusted.

In some forms, a tangential tracking system dispenses with tone-arms; in others, it utilizes an abbreviated tone arm. But in all systems, the stylus moves in a straight line across the record surface, as opposed to moving in an arc, as on a pivoted tone arm. This arc skews the position at the outside grooves of a record, causing improper groove tracking and distortion that's greatest at the inside grooves of the record. While this distortion, even in high-quality, well-engineered turntables, may not be noticeable to many buffs, it is there.

Following is a rundown on how seven manufacturers achieve proper tracking. We describe nine current turntables with unusual tone-arm drive mechanisms.

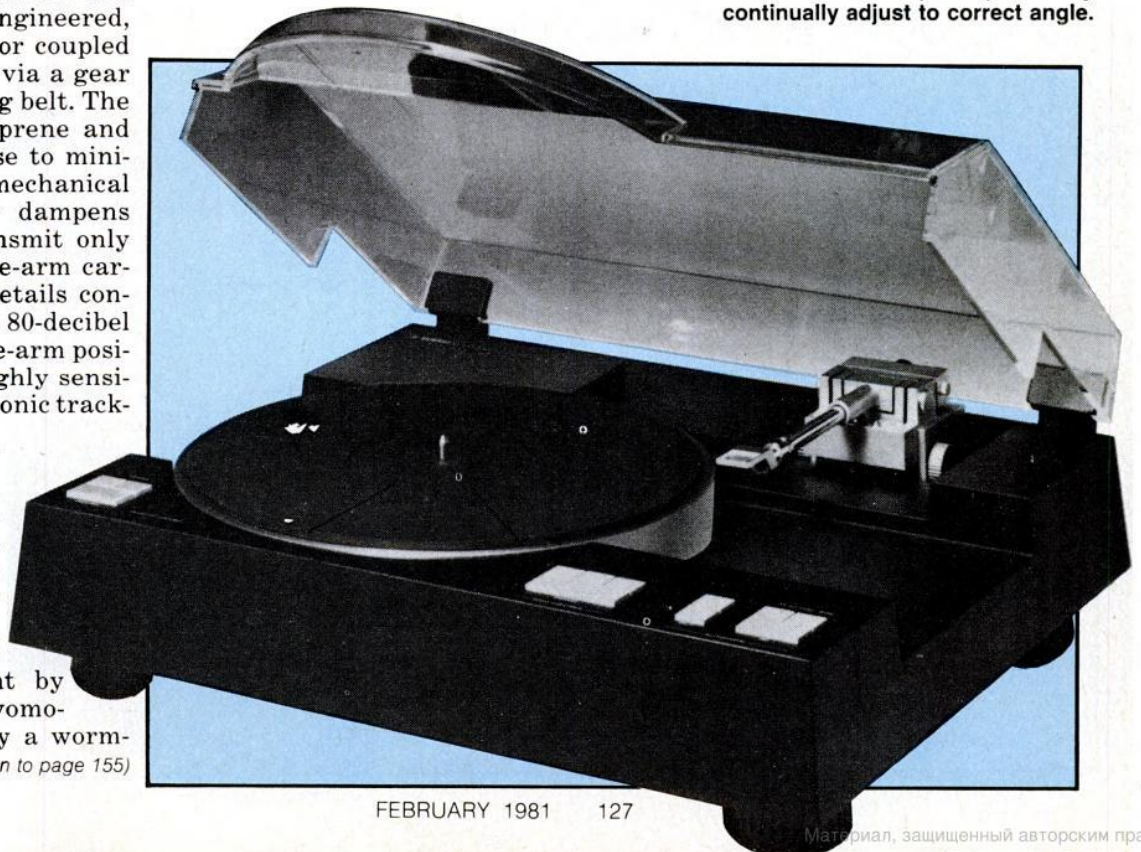
In *Yamaha's Model PX-2* (\$900), the tone arm is driven across the record by a precision-engineered, high-torque coreless motor coupled to the tone-arm carriage via a gear system and noise-damping belt. The motor is encased in neoprene and supported on a butyl base to minimize transmission of mechanical noise. The belt further dampens mechanical noise to transmit only smooth power to the tone-arm carriage. All these design details contribute to the PX-2's fine 80-decibel signal-to-noise ratio. Tone-arm position is controlled by a highly sensitive, dual-CDS opto-electronic tracking sensor.

Mitsubishi Model LT 5V (\$450) is a vertical "stand-up" radial-drive turntable. A high-precision servomotor drives the tone arm assembly via a specially wound stainless-steel wire. Wire tension is kept constant by spring loading, and servomotor rotation is applied by a worm-

(Please turn to page 155)



The most unusual feature of Aiwa LP-3000 is that the tone arm is powered by two separate motors—one drives the arm across the record and other lifts and cues it. Photodiodes are also in the Yamaha PX-2 table (below) and they continually adjust to correct angle.



7 new shapes in stereo

Kenwood 44



Aiwa CS-880



Sansui CR-M7



JVC PC-5



Toshiba KT-R2

Look what's happened to stereo—it's more portable and versatile than ever before, and some units even have TV.

by Fred Petras

To most people, a stereo is a compact table-top music system, a big console, or a group of audio components and a pair of speakers. But a look at the latest crop of audio products reveals many exciting trends in the design of new stereos.

Custom racks and cabinets

Many manufacturers now offer ensembles of components and the furniture to house them. Previously, it was up to the buyer to choose and match components—even if he stayed with one manufacturer. These “designer” systems feature perfectly matched components along with the beautiful furniture.

The “caseiver”

Here's a new audio component that combines two traditional ones. A combination of

Pictured here and detailed in text are seven products that have changed the “look” of stereo. The Kenwood 44 system is the first of the lowboy-style, rack-mounted components; Aiwa's CS-880 features a super-low, bassy sound circuit; Sansui CR-M7 combination cassette deck and receiver is called a “caseiver”; JVC's PC-5 is a set of five snap-together components; Toshiba's KT-R2 cassette not only records, but has two cassette-shaped tuners to receive AM and FM; Sharp 3M95 features 9-inch black and white TV along with its powerhouse audio; Sharp's VZ-3000 has upright turntable with two tone arms to play both sides of a record without flipping it.

Sharp VZ-3000



PM photo: Bill Ashe

Sharp 3M95



THE COMPUTERIZED

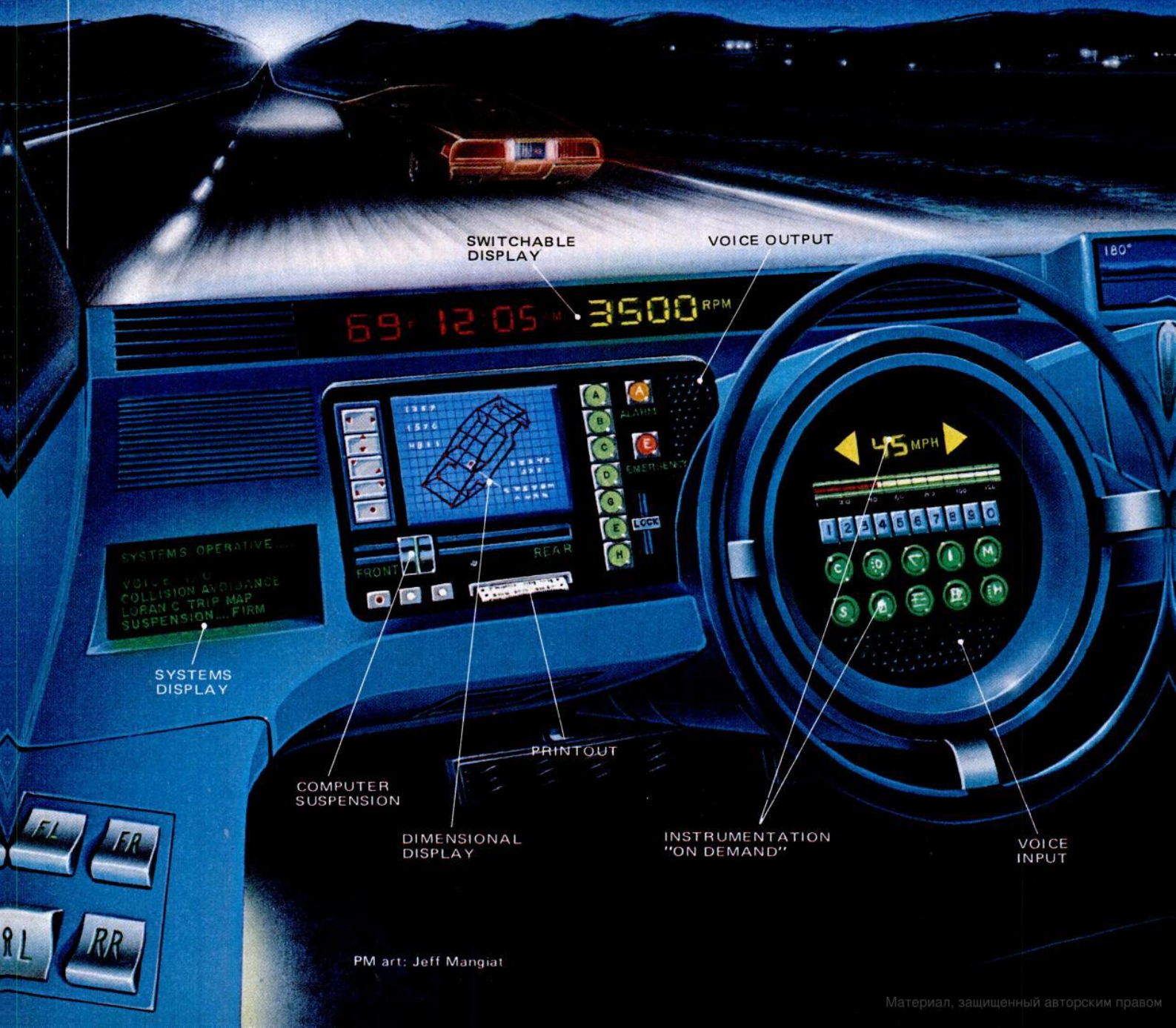
GM's Computer Command Control is just the beginning.

Even more advanced computers will soon turn the family car into a dream machine.

"And where would you like to go today? Run program or manual, boss?" the sultry, alluring voice purred.

The driver settled himself into a seat which instantly moved to his favorite driving position. His hands gripped the wheel and he answered: "Let's head for Chicago, Helen. Route-program Four-Delta and keep your locator on. Keep all visuals on priority standby and, please, don't let me miss the information dump from the Buffalo office."

"Anything you say, boss." The disembodied voice's tone was assured and competent as the car rolled smoothly into the traffic flow.



CAR OF TOMORROW

Stranger than fiction

The scenario above isn't an outtake from *Buck Rogers*, but a pretty good prediction of how a daily drive will begin in the quite-near future. Now that computers have arrived in today's cars, tomorrow is closer than ever before. All it will take is the next "generation" of automotive computer.

In case you haven't guessed, the disembodied voice was our car's voice output. The driver spoke his words into a microphone built into the wheel—and the car followed his orders. If this leaves you skeptical, bear in mind that voice input and output is already being used—in everything from televisions

that follow spoken requests for channel changes to clocks that speak the time out loud.

In fact, everything we have included in our car of the future can be done *now* with computer technology. Let's take a look at just a few of the systems such a car will feature.

Map/locator

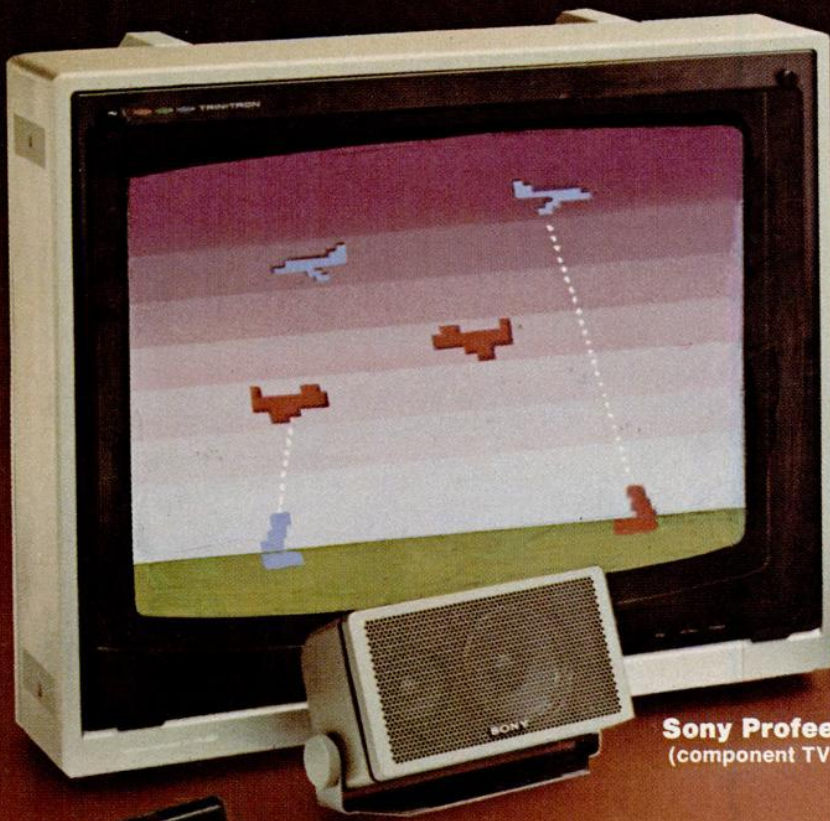
You're never going to get lost driving this car. The computer stores (via bubble memory) maps of the 300 largest American cities. Under the hood is a sophisticated locating system based on today's Ioran C radio navigational aids. This Ioran C unit feeds its



Tune in on

Satellite TV, flat screens, larger-

by Hans Fantel



Sony Profeel
(component TV)



The two TVs shown here—Zenith's Video Hi-Tech and Sony's Profeel—can do much more than simply receive television transmissions via antenna. They hook up easily to all of the devices pictured around them. You can connect a laserdisc or a home computer, since these televisions have both direct and antenna-video inputs. The Sony Profeel features a separate tuner and two speakers, while the Zenith has a built-in tuner along with its two outboard speakers. These are the first of the TVs you will be seeing that can do it all—handle the whole spectrum of the world of video.



Sony CC100
(video camera)

Mattel Intellivision (video game)



Sony SL-5400
(videotape recorder)



PM photo: Peter Johansky

Материал, защищенный авторским правом

tomorrow's television!

than-ever projection sets—all these and more are just over the horizon.



Pioneer LaserDisc (videodisc)



Atari 800 (home computer)

While you were in the kitchen, escaping commercials and getting a snack, the video future sneaked up on you:

- Network TV is being challenged by satellites beaming programs directly into your home from outer space.

- High-tech cable services are providing two-way communications and direct access to data banks.

And before too many more commercial breaks, you'll find that:

- The trusty old TV set has given way to component video with high-definition pictures and stereo sound.

- Wide-band video transmission is providing sharper detail, so images can be projected on large screens without loss of clarity.

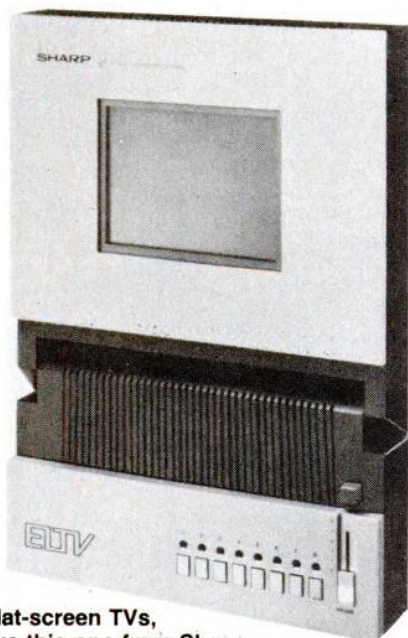
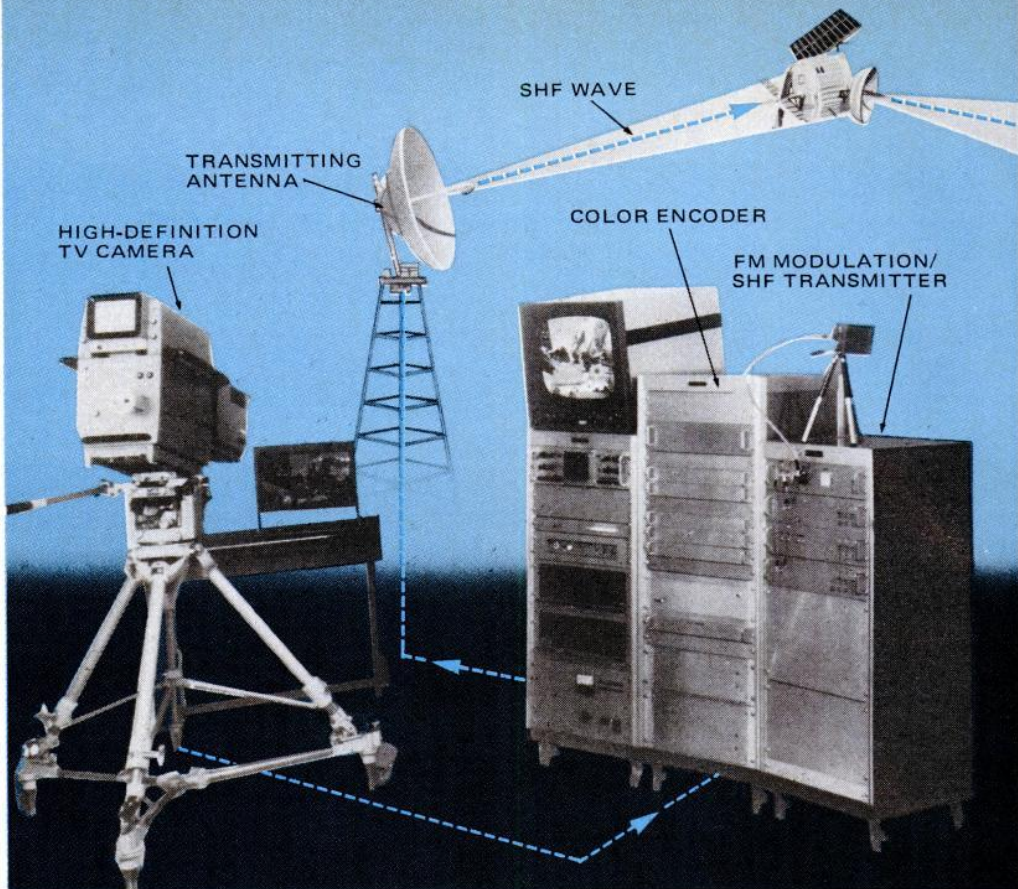
- Film and photography may be replaced by



Zenith Video Hi-Tech (direct-input TV)

Sharpest TV picture

A television picture as clear and detailed as a 35-mm slide may be on the way. Matsushita (Panasonic's parent company) recently demonstrated its new system of satellite, high-resolution TV. The quality of the image was little short of fantastic. With over 1,000 scanning lines, this high-resolution technology runs video circles around present-day pictures. Matsushita envisions using the system as part of a direct-satellite broadcasting system. As shown here, such a system would send pictures taken with a high-definition TV camera, and specially encoded and modulated, up to a satellite at super high frequencies (SHF). A customer's home, equipped with a rooftop antenna, would receive these signals from the satellite. Signals from the antenna would first go to a down-converter which would translate the SHF signals to the ultrahigh-frequency (UHF) range that the TV set uses. These high-definition signals, because of their improved resolution, would be ideal for wide-screen TV. This would eliminate fuzziness on big-screen sets.



Flat-screen TVs, like this one from Sharp Electronics, should be appearing on the market within the next few years.

instant-playback video camera/recorder combos.

The cathode-ray tube—key to conventional TV—is making way for the flat “picture wall,” consisting of liquid-crystal light emitters.

The impact of these developments will ultimately affect almost every phase of your home life and leisure. But first, let's look at what you can get *right now*.

Component video

Component video is to ordinary TV sets as component stereo is to ordi-

nary radios. Sony and Zenith are pointing the way. Instead of putting all the works in a single box, they designed video systems like audio components, made up of interconnected functional units.

Sony's new Profeel Series, for example, features a separate monitor screen—available in either 19- or 25-inch size) whose image resolution matches that of professional broadcast monitors. It contains elaborate circuits which automatically adjust contrast levels between bright and dark areas of the picture, control color balance, prevent color spill and suppress the visual noise that normally shows up as “snow” or “confetti.”

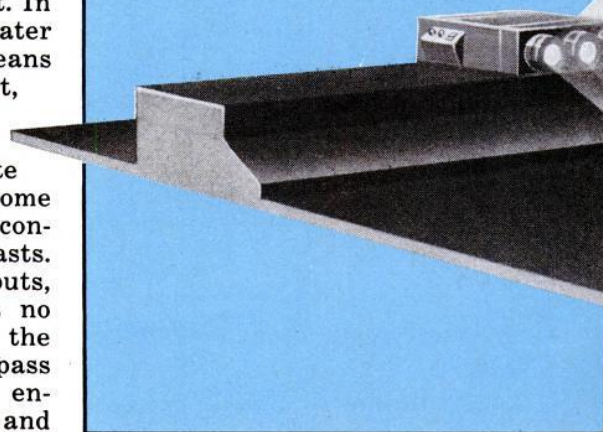
Linked to this monitor is a separate, cable-ready, frequency-synthesized tuner with wide-band video circuits. This works like wide-band frequency response in audio: The wider bandwidth lets you put more information through the circuit. In the case of audio, it means greater sonic fidelity. In video, it means sharper picture detail. In short, this approach yields a kind of “high-fidelity” video.

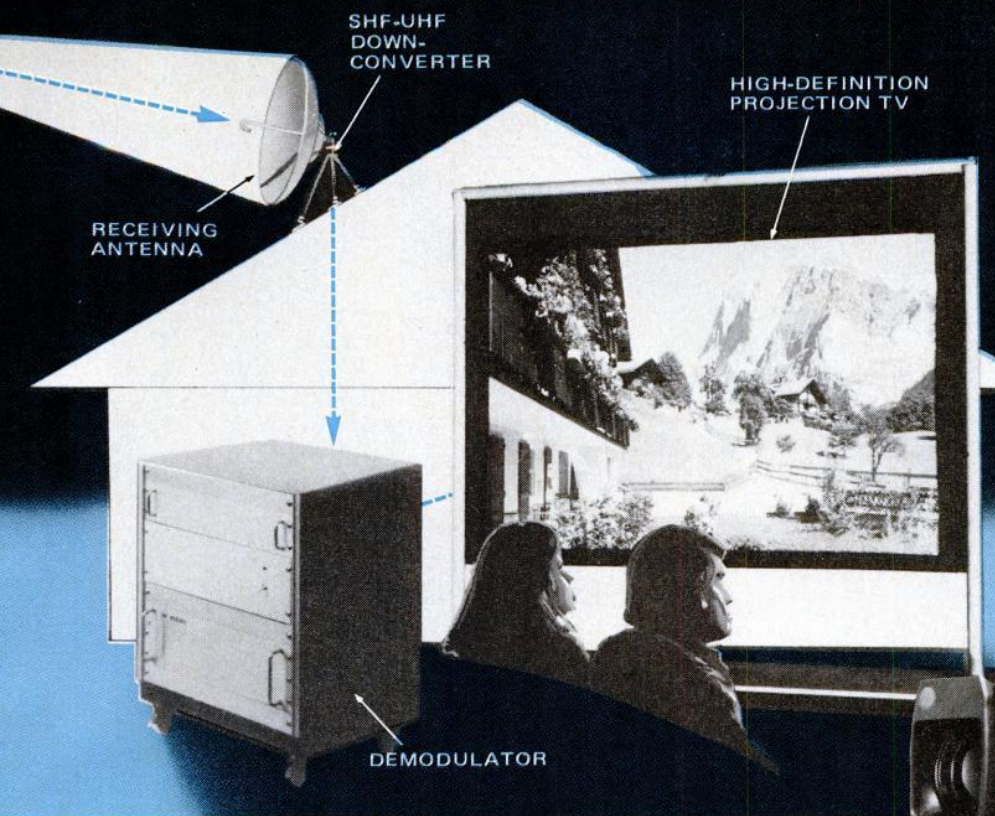
The tuner also has separate inputs for VCRs, videodiscs, home computers, video games—even converters for coded broadcasts. Thanks to these separate inputs, these external signal sources no longer have to be attached to the antenna terminals, so they bypass the radio-frequency (RF) stage entirely. This eliminates the noise and

distortion inherent in the demodulation of RF signals. For added convenience, the tuner also operates in a scan mode, sampling on-the-air programs as well as cable presentations in a given area.

The audio section of this component video system is equally remarkable. For one thing, it's ready for stereo and will be able to receive stereo TV as soon as this type of broadcasting is authorized by the Federal Communications Commission. The audio section can also handle the stereo sound on the latest laser videodiscs and from the more

Big-screen video takes a giant step





with its new Video Hi-Tech designs, which also use a monitor-type screen and direct inputs for external program sources. The component approach, says Zenith executive Walter Fisher, "makes the TV receiver an integral part of a home-communications system."

Expanded program capability

Many of the latest television sets can receive more than 100 channels (including the new superband cable spectrum) without outboard converter boxes. Surprisingly, all this extra channel capacity is filling up fast. A growing number of special-interest programs—anything from

(Please turn to page 160)

venturesome cable systems, which are beginning to offer stereo programs.

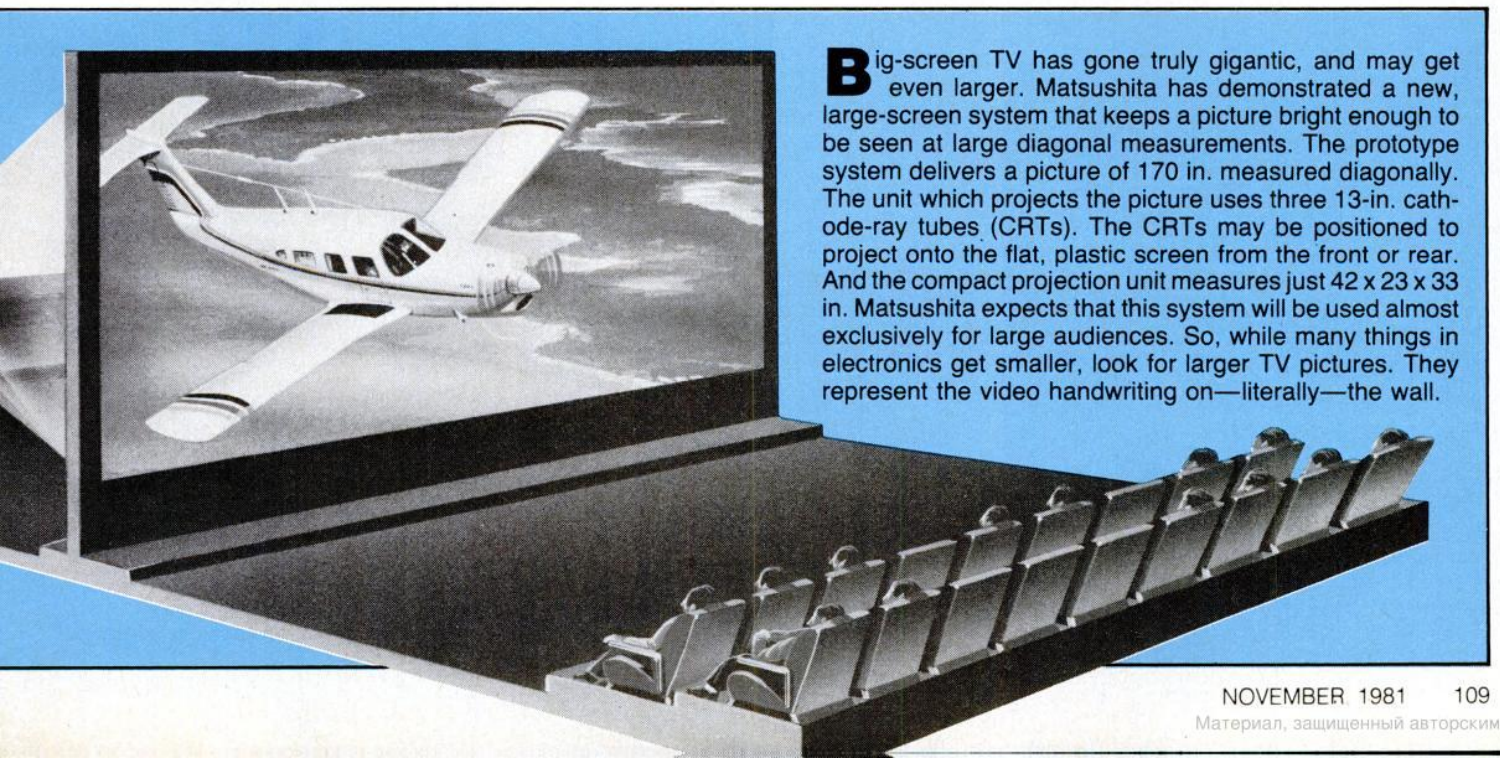
In keeping with the component concept, the audio amplifier and the two speakers are also separate. This provides a cost-saving advantage if you already own a stereo sound system. Then you don't have to buy the audio section at all. You can feed the audio signal from the video tuner directly to your stereo amplifier and speakers.

No doubt, Sony's bold move will prove to be a trend setter. Zenith has already followed Sony's lead

Prototype unit from Sony is a combination videotape recorder and video camera.

This one-piece unit is just as portable as home-movie equipment and such units are directed at competing in that marketplace. Other makers, like Hitachi, have shown similar prototypes.

As soon as video editing equipment and accessories are available at consumer prices, camera/recorder setups like these should prove to be quite popular.



Big-screen TV has gone truly gigantic, and may get even larger. Matsushita has demonstrated a new, large-screen system that keeps a picture bright enough to be seen at large diagonal measurements. The prototype system delivers a picture of 170 in. measured diagonally. The unit which projects the picture uses three 13-in. cathode-ray tubes (CRTs). The CRTs may be positioned to project onto the flat, plastic screen from the front or rear. And the compact projection unit measures just 42 x 23 x 33 in. Matsushita expects that this system will be used almost exclusively for large audiences. So, while many things in electronics get smaller, look for larger TV pictures. They represent the video handwriting on—literally—the wall.

BEAT YOUR HANGUPS

Here's Your Ultimate Telephone Center

Everything from digitally controlled remote telephones to slow-scan TV phones can be yours right now. Here's how to choose from the most exciting phones and accessories ever.

BY MARC STERN; Photographs by Layman/Newman

TYMSHARE SCANSET XL
(Terminal)



AT&T GENESIS
(Telephone)



Imagine sitting down at your phone tonight, calling a friend and talking while he *watches* you. Or, going to your phone, dialing a number and having the world's latest news flash onto a screen. Does it sound like science fiction? It isn't, it's just part of the Popular Mechanics "Ultimate Phone System."

These features and more are available right now, thanks to the electronics revolution and microelectronic technology. We set up the system you see here and explain how it works, step by step.

Genesis of the system

Genesis looks much like an everyday electronic phone, but it is actually much more. The keypad is a dead giveaway. Instead of having the traditional buttons, it has a touch-sensitive membrane keypad with which you enter your phone numbers. Inside the unit is microelectronic circuitry that handles many chores.

For instance, the circuitry allows one-touch calling of seven programmed numbers and emergency numbers. In addition, it has a save-send feature, which

ZENITH CV1950
(Color monitor)

ZENITH VC1810
(Color camera)

DUOFONE TAD-150A
(Phone answerer)

UNIDEN EX-2600
(Remote telephone)

ROBOT 450C
(Color slow-scan TV unit)

With her picture being previewed on the monitor, and ready to be sent to another phone equipped with the Robot 450C television unit, our model chats on the fully computerized Genesis telephone.

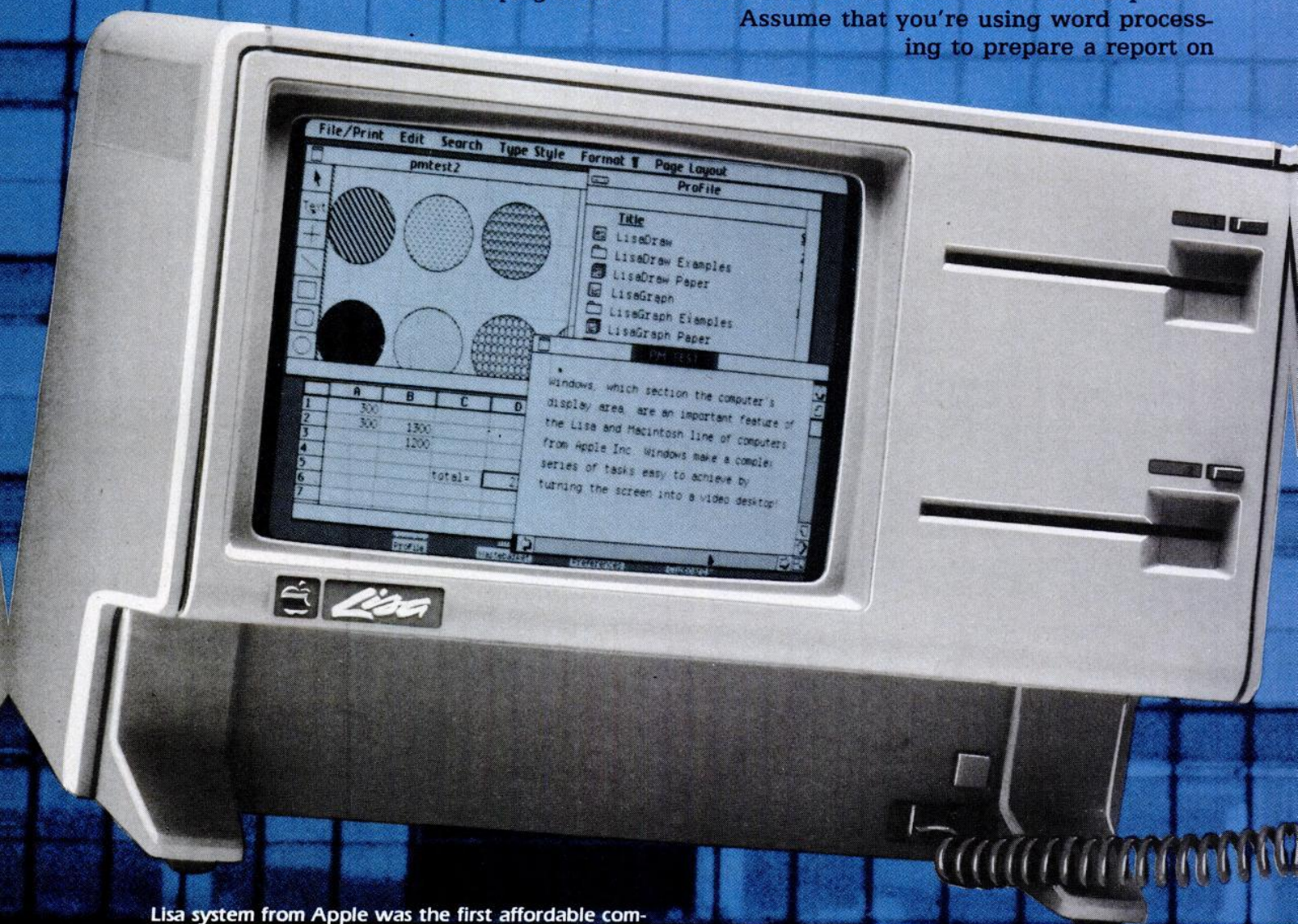
Meanwhile, she'll be able to do everything from getting stock quotes to booking an airplane flight on the Scanset XL terminal. If she does take that airline flight, the Duofone TAD-150A will take messages while she's away. But if she leaves only for a different room, the Uniden will keep her in touch.

SOFTWARE- Now It Does Windows!

Throw out the cellophane tape and rubber cement. Window software, which is an extension of a computer's disk operating system, makes the screen your desk. It does this by creating actual windows on the screen, through which each program or datafile can be viewed and possibly manipulated. Each program or datafile becomes a file folder lying on the

desk, or "workspace," as it's usually called. Just as you might open a folder, even place it partially on top of another folder, or move papers or records from one folder to another, now you can open "electronic folders" and move information and records between them. Each open electronic folder appears as a "window" on the screen, thus the term "windows" for the software that simulates a workspace.

Assume that you're using word processing to prepare a report on



Lisa system from Apple was the first affordable computer to make great use of "windowing." Note that the screen is split into different sections. Each section is called a window. A different program may run inside each window and information may be shared between programs. A roller device called a mouse (upper right) moves information from one window to another. Move the mouse atop a desk to point at the data and an onscreen pointer moves.

Being able to put several files on the screen at one time lets you get more power from your computer.

BY HERB FRIEDMAN; Photo by Bill Ashe

your company's future manufacturing needs. You want to include a projection for 1984-1985 that you prepared with a spreadsheet program. Using window software, you create a window within the word-processing display, call up your spreadsheet program within the window, select the desired data and transfer it into the report, and then close the window so you have the rest of the screen available. Alternately, you might open two, three or more windows so as to compare different projections before deciding on the one to include in the report.

Your report and its printout will contain all

the information you transferred directly from the spreadsheet data.

Window software that permits concurrent operation, rather than simple data selection from each windowed program, allows endless variations in program usage. For example, it lets the user bring up the computer as a word processor, then open one or more windows into a running spreadsheet and experiment with different kinds of data. But that's not all. The user can open yet another window into a program that converts each change in spreadsheet

(Please turn to page 207)

